

# Flexural Strength of PMMA Modified with Palm-oil Based Polyol

## Abstract

**Objectives:** Biocompatibility is an important desirable property for a dental polymer and it can be achieved by utilizing more materials from natural sources. The flexural strength of an experimental polymer prepared from MMA monomer modified with palm-oil polyol was compared to two commercial resins, namely the Lucitone 199® (Dentsply Trubyte, USA) and Impact (Ivoclar Vivadent, Liechtenstein). **Methods:** The experimental polymer was prepared by copolymerizing MMA monomer and palm oil polyol. The resulting polymer was cast into a plate form and sectioned using a precision diamond saw (Buhler, Germany) to form 10 specimens of dimension, 65mm x 11mm x 5mm. These specimens were then polished to achieve a nominal dimension of 64mm x 10mm x 3.3mm. Another 10 specimens were prepared using Lucitone 199® and Impact according to the manufacturers' instructions and were polished by the same procedure. Their flexural strengths were determined using a three point bend test on an Instron Universal Testing Machine (Anytown, Australia) according to the procedure of test method ISO 1567. Data obtained was analysed using Oneway ANOVA (SPSS 12.0) at 95% confidence interval. **Results:** The mean flexural strength of Lucitone 199® was 127.39MPa ( $\pm 16.54$ ), Impact was 177.57MPa ( $\pm 11.44$ ) and experimental polymer was 51.62MPa ( $\pm 4.21$ ). Although the experimental polymer has exhibited higher flexural strength than PMMA homopolymer, it has lower flexural strength when compared to Lucitone 199® and Impact denture base resins, both of which were filler-reinforced materials. **Conclusions:** In this preliminary study, the experimental polymer contained a significant proportion of non-petroleum based materials derived from palm oil. Its lower flexural strength is expected to be enhanced and improved through the incorporation of reinforcing fillers or fibers in future work.

<b>Authors:</b>	SHAHABUDIN, N.; ABU KASIM, N.H.; Gan, SN
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